Peripheral Vascular Disease

by Carrie A. Totta, MD

PAD generally refers to a disorder that obstructs blood flow to the lower or upper extremities more commonly caused by atherosclerosis. PAD strongly correlates with risk of major cardiovascular events. Because it is frequently associates with coronary and cerebral atherosclerosis, PAD is commonly under diagnosed and undertreated.

The prevalence of PAD varies depending on the population studied. It is present in <4% of people 40 years or older, but in 20% of those >65% is greater in males than females. Only 20-30% of people with PAD have symptoms of claudication.

Risk factors include tobacco, diabetes, dyslipidemia and hypertension. 90% of patients with claudication are current or ex-smokers. Progression of disease is more likely in patients who continue to smoke.

The cardinal symptoms of PAD include intermittent claudication and rest pain. Intermittent claudication refers to a pain, ache, sense of fatigue or other discomfort with exercise and resolves with rest. The location of the symptom often relates to the site of the most proximal stenosis. Buttock, hip or thigh claudication usually occurs with aortic or iliac disease. Calf claudication characteristics femoral or popliteal artery stenosis. Ankle or pedal claudication occurs in patients with tibial and peroneal artery disease. Calf and thigh pains that occur at rest, such as nocturnal cramps are not a symptom of claudication. The history of patients with claudication should include the walking distance, incline and speed that precipitates claudication.

Symptoms resembling claudication occasionally occur from nonatherosclerotic causes of arterial occlusive disease. These include giant cell arteries, aortic coarctation, FMD or extra-vascular compression caused by arterial entrapment. Nonvascular causes of exertional leg pain should be considered including lumbosacral radiculopathy, spinal stenosis, arthritis and chronic venous insufficiency. Symptoms may occur at rest in patients with critical limb ischemia, typically described as pain or parasthesias. The pain worsens on leg elevation and improves with leg dependency. Leg ulcers, fissures or necrosis can occur.

> In office practice, an ABI may be used to identify PAD. It may also indicate those at risk for Coronary Ischemic events and Cerebral events. Ultrasound testing can be one sensitive and specific way to find those with whom may benefit from steps to convert this high risk subset of people to lower risk intervention for coronary or carotid disease, even when Asymptomatic by starting with ABI. Those with positive ABI are some of the sickest patients that enter your office every day. They die not from leg disease as much as CAD or Cerebral Vascular events.
>
> Michael S. Mancina MD

Testing for arterial disease

An ABI furnishes one of the most useful and simplest noninvasive tests to evaluate the presence and severity of stenosis in the peripheral arteries. Determination of the ABI is easy to perform at the bedside. This index is the ratio of SBP measured at the ankle to the SBP measures at the brachial artery. The normal ABI ratio should be 1.0 or greater. However, recognizing the variability intrinsic to sequential BP measurement and ABI of less the .90 is considered abnormal. This value (0.9) is 90-95% sensitive and 98% specific for PAD. The ABI is often used to gauge the severity of PAD. Patients with symptoms of leg claudication often have ABI's ranging from 0.5 to 0.8 and patients with critical limb ischemia usually have an ABI less than 0.5.

In patients with skin ulceration, an ankle blood pressure less than 55mmHg predicts poor wound healing. One limitation of leg blood pressure recordings (ABI) is that they cannot be used reliably in patients with calcified noncompressible vessels i.e., some diabetics or renal insufficiency patients.

Duplex Ultrasound Imaging

Duplex Ultrasound Imaging provides a direct, noninvasive means of assessing both the anatomical characteristics and the functional significance of arterial stenosis. Ultrasound allows visualization of plaque and measurement of flow velocities particularly of

areas of flow abnormalities. A twofold or greater increase in peak systolic velocity at the site of an atherosclerotic plaque suggests a stenosis 50% or greater. An occluded artery generates no doppler (blood flow) signal. When compared to angiography ultrasound has 95% specificity and 80-90% sensitivity.

CT Angiography

CT Angiography uses IV administration of radio contrast agent to opacify and visualize the aorta and peripheral arteries. Images can be displayed in three dimensions and rotated to optimize visualization of arterial stenosis.

Contrast Angiography

Conventional Angiography using an iodinated or other contrast agent can aid in the evaluation of arterial anatomy prior to a revascularization procedure. Injection of radiocontrast material into the aorta permits visualization of the aorta and iliac arteries. Injection of contrast material into the iliofemoral segment permits optional visualization of the femoral, popliteal, tibial and perineal arteries.

Prognosis

Patients with PAD have an increased risk for adverse cardiovascular and cerebrovascular events (due to increased prevalence of CAD and Coronary Artery Disease). In addition, they often have impaired quality of life and risk limb loss. In the AGATHA registry (a global atherothrombosis assessment), approximately 50% of patients with PAD had established Coronary Artery Disease and 50% had prior Stroke or TIA. The specificity of an abnormal ABI in predicting future cardiovascular events is approximately 90%. The risk of death is greatest in those with the most severe PAD and mortality correlates with decreasing ABI. Approximately 25% of patients with critical limb ischemia die within one year and the one year mortality rate among patients who have undergone amputation for PAD may be as high as 45%. While the prognosis is poor, the opportunity is great to identify the sickest patient and organize testing to prevent MI or Stroke.

Approximately 25% of patients with claudication develop worsening symptoms. Both smoking and DM independently predict progression of disease. In patients with DM, the risk of amputation is at least 12 fold higher than in nondiabetic persons.

Treatment

Goals include reduction in cardiovascular morbidity and mortality, as well as improvement in quality of life by decreasing symptoms of claudication, eliminating rest pain and preserving limb viability. Therapeutic consideration includes life-style modification and pharmacological therapy to reduce the risk of adverse cardiovascular events. This includes lipid lowering therapy, smoking cessation, aggressive treatment of Diabetes, blood pressure control and antiplatelet therapy. In addition, in the U.S., the FA has approved 2 drugs Pentoxifylline (Trental) and Cilostaol (Pletal) for claudication in PAD.

Exercise Rehabilitation

Supervised exercise rehabilitation programs improve symptoms of claudication. Exercise programs can increase the average walking distance by 180 feet. The greatest benefit occurred when the training sessions were at least 30 minutes in duration 3 times a week for at least 6 months and walking was used as the mode of exercise.

Peripheral catheter based interventions are indicated in patients with lifestyle-limiting claudication despite a trial of exercise rehabilitation and pharmacotherapy. Endovascular intervention is also indicated in patients with critical limb ischemia whose anatomy is suitable to catheter based therapy. Surgical revascularization is generally indicated to improve quality of life in patients with disabling claudication on maximal medical therapy and to relieve rest pain and preserve limb viability in patients with critical limb ischemia not amenable to percutaneous interventions.

A preoperative evaluation to assess the risk of vascular surgery should be performed because many of the patients have coexisting coronary artery disease,